CASE REPORT

Gorham-Stout disease: a textbook presentation of a rare disease in Pakistan

Muhammad Ibrahim[1], Muhammad Usman[2], Hawwa Khan[3], Faryal Javaid[4], Maria Tasneem[5], Zeeshan Khan[6]

Abstract

Gorham-Stout disease is an exceptionally rare disease which is characterised by massive osteolysis of the bone, oedema, and in severe cases pleural effusion and chylothorax. Its aetiopathology is unknown, and no specific treatment has been modulated thus far. We report the case of a 17-year-old male with osteolysis in the bones of his entire left arm and persistent chylothorax. Due to the late presentation and patient's desire for a better quality of life, amputation was the only choice left for treatment. This case was evaluated and treated at the Orthopaedic Surgery and Trauma department of Rehman Medical Institute in Peshawar, Pakistan.

Keywords: Gorham Stout Syndrome, Massive osteolysis, Rare disease.

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Introduction

Gorham-Stout disease, also known as vanishing bone disease, is a rare disorder characterised by progressive osteolysis of the bone, most commonly affecting children and young adults.[1] The first report of this disease is attributed to Jackson in 1838 who described the case of a vanishing humerus.[2] but it was Gorham and Stout in 1955 who associated the presence of angiomatosis of blood and lymphatic vessels as a characteristic feature of the disease.[3] The risk of the disease is not limited to race, gender or age. There have been reports of patients as young as one month up to those who were 75 years old.[4]

The disease can present in a variety of ways, and high clinical suspicion is required to reach a diagnosis. Patients may present with a dull aching pain, swelling, loss of function, and even pathological fractures. GSD can be self-limiting, but in most literature, it has been reported as progressive.[5] Complications such as osteomyelitis, septic shock, paraplegia due to vertebral involvement and meningitis have been rarely reported, but by far the most common sequelae of the disease is chylothorax, occurring in 17% of the patients.[6] This can lead to respiratory insufficiency; survival rate with thoracic involvement is less than 40%.[7]

Gorham-Stout patients can be managed conservatively using physiotherapy to strengthen the muscles around the affected bone/joint or medications which include Bisphosphonates, and Vitamin D and Calcium supplements.[8] In severe symptomatology, radiotherapy and surgical modalities are used.[9] Although radiotherapy has proven to be beneficial but it comes with the risk of developing secondary malignancies and growth restrictions in kids and adolescents, if used in high doses.[10] Surgical intervention includes joint replacement in some cases, while in others surgical resection/amputation is the only modality that is best fitting for the patient.[11]

Despite publication of extensive reports, the aetiology of the disease remains unknown, and effective therapies have not been modulated.[12] Around 300 cases of GSD have been reported worldwide. Our case documents the second report of GSD in Pakistan; the first was reported in Karachi by Ali et.al. in 2019.[11]

Case report

This report details the case of a 17-year-old male who presented with a highly oedematous left hand and forearm (Figure 1). Consent was given for this case report by the patient and his parents. The disease started when he was one-year-old, with the family reporting a birth mark on the left wrist which started swelling and later extended to the whole limb. Despite regular medical consultation, no proper diagnosis could be made. A Doppler ultrasound conducted in July 2010, showed dilation and arterialisation of the left subclavian vein.

At five years of age, the child had a pathological fracture of the left distal radius and ulna with non-union, which was subsequently corrected with K-wire fixation and bone grafting. The bone specimen sent for histopathology showed mature bony trabeculae with intervening fibrous stroma, and no evidence of malignancy, bone marrow cells, or granuloma.

[1-3,6]Department of Orthopaedic and Trauma, Rehman Medical Institute, Peshawar, Pakistan; [4,5]Department of Pathology, Rehman Medical Institute, Peshawar, Pakistan.

Correspondence: Muhammad Usman.

Email: musmanyazdani98@gmail.com

ORCID ID: 0009-0008-5465-9413

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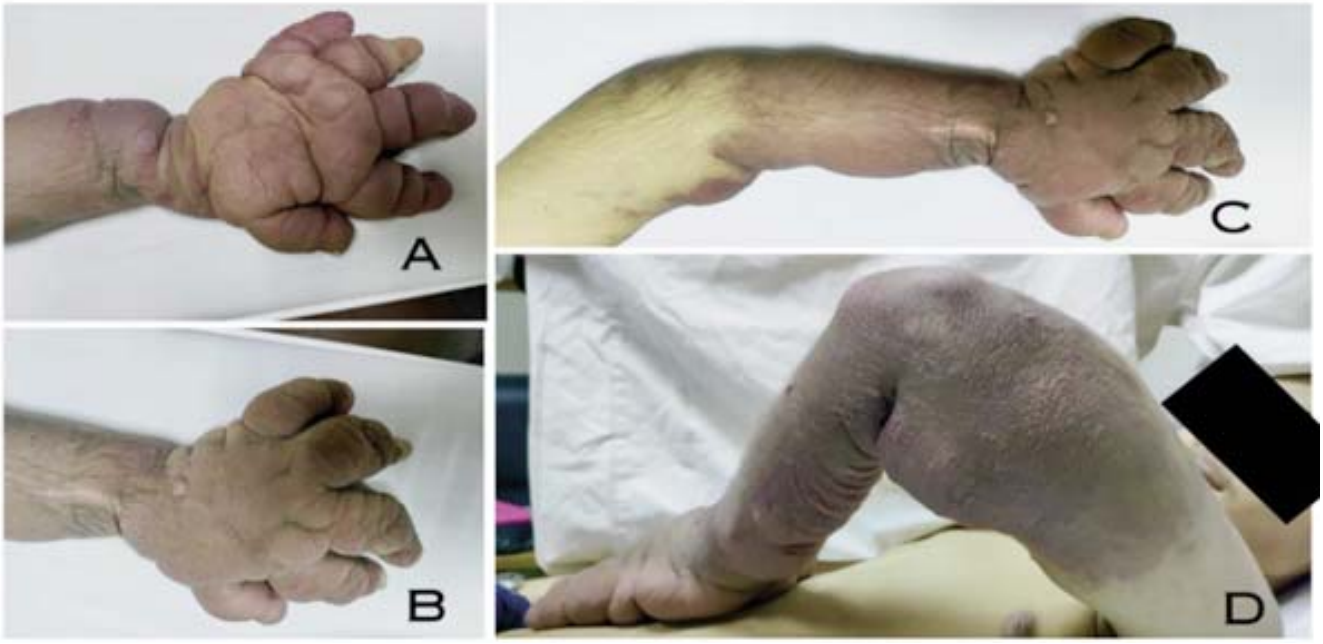

Figure-1: A. Left-hand volar view, and B. Left-hand dorsal view, showing generalised oedematous changes and discolouration. C. Left upper limb dorsal view, showing predominant involvement of distal arm, forearm, and hand. D. Left upper-limb lateral view showing involvement up-till distal arm.

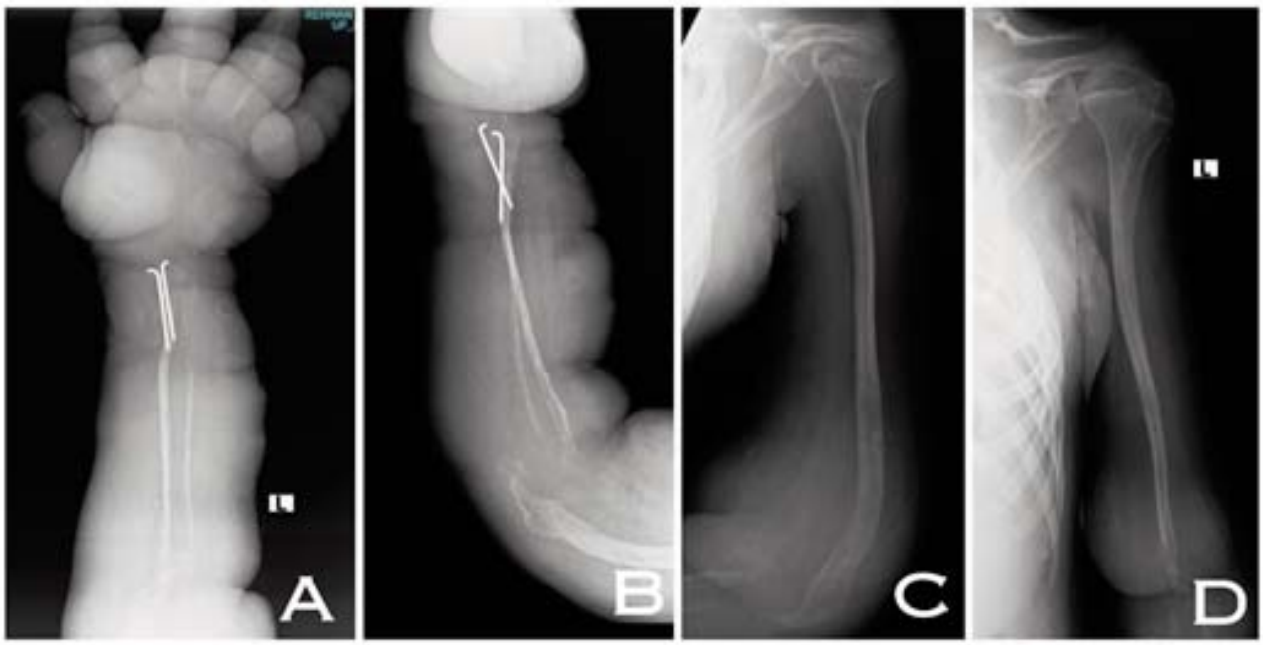

Figure-2: A. Anteroposterior view of left forearm and hand, showing remnant of radius and ulna, near disappearance of carpal bones. B. Lateral view of left forearm showing remnant of radius and ulna. C. Lateral view of left humerus, and D. Anteroposterior view of left humerus showing deformity, thinning of cortices, and disappearance of distal humeral condyles.

The disease continued to progress and started to involve the left side of the chest also. Initially, the left chest wall started swelling and the patient developed shortness of breath. Initial chest X-rays showed absence of upper ribs, and deformation of the left clavicle. The child then developed chylothorax. In June 2012, two attempts were made at chemical pleurodesis, but it was unresponsive. Consequently, surgical pleurodesis was performed for the persistent chyle leakage. Pleurocentesis was also performed in 2013.

CT scan done in 2013 after thoracotomy showed deformation of the left hemithorax with extensive pleural

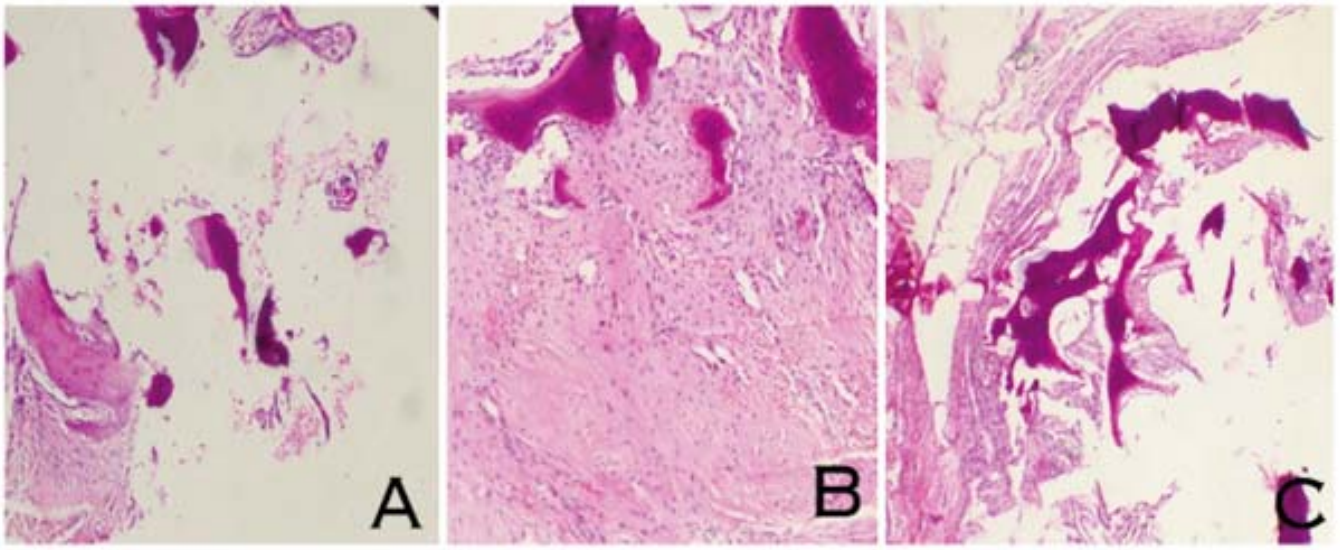

Figure-3: A. Photomicrograph of fragmented bony trabeculae with blood vessels and well-vascularised stroma (10x HandE stain). B. Fragmented bony trabeculae without osteoblasts and dense granulation tissue (4x Hand E stain). C. Fragmented bony trabeculae, activated osteoclasts, dense fibrous stroma, and absence of osteoblasts (10x HandE stain).

thickening extending into the horizontal fissure. The left clavicle and second, third, and fourth ribs were also reported to be deformed with the anterior end of the third rib almost completely resorbed. The lower end of the sternum exhibited an inward curve, i.e., pectus cavatum. Scoliosis of the spine was observed on the Chest X-ray. The right lung along with the rib cage appeared normal. No other abnormalities were noted.

On September 14, 2023, the patient presented at Rehman Medical Institute, Peshawar, with mild reduction in the size of the anterior mediastinal mass, but the lesion in the left chest wall and axilla had increased in size. The chief complaints of the patient were generalised swelling of the left upper limb with skin discolouration and severely affected daily life activities. The disease process had rendered the entire limb completely functionless. X-ray radiographs showed remnants of the long bones, thinning of cortices, and disappearance of distal humeral condyle (Figure 2). A surgical decision of an above elbow amputation was made after taking consent of the patient and his parents' desire to attain an improved quality of life. Histological slides demonstrated fragmented bony trabeculae, activated osteoclasts, dense fibrous stroma, and absence of osteoblasts (Figure 3) The patient is doing well post-operatively and comes for regular follow-up with no reported complications yet.

Discussion

GSD is a rare disease entity with no specific diagnostic tests. Characteristic radiographic findings have been detailed by Resnik,[13] with a progression from radiolucent foci in the subcortical regions to the classic atrophy and dissolution of the bone. The disease also progresses through to contiguous bones, as seen in this patient with the spread of disease from the wrist up till the humerus. Lab investigations offer nothing significant, where only a slight increase in alkaline phosphatase may be noted.[13]

The course of the disease is highly varied, with different rates of progression and extent. Campbell et al. have reported a spontaneous regression of the disease as well after repair of a pathological fracture.[14] Unfortunately, most cases show progression involving multiple bones, as in the case of this patient. Additionally, the patient also had spinal involvement and pleural effusion, making it a very severe case of GSD.

Chylothorax is an established complication of the disease and may be fatal. Tie et al. reported 11 patients who underwent thoracic duct ligation but with varied success.[6] Some success has been reported with pleurodesis, with J. H. Patrick documenting survival of a patient with chylothorax.[15] The current patient underwent surgical pleurodesis, but a year later pleurocentesis was performed due to persistent chyle leakage.

As of yet, no single treatment modality has proven to be entirely successful in the treatment of GSD. The treatment approach has to be decided according to the stage of the disease. If diagnosed early, treatment with Bisphosphonates and Interferon α2b (INF-α2b) has shown some success in slowing the massive osteolysis. Radiotherapy with an average dose of 45 Gy has also shown some success, but not without its side effects

which may result in patient's refusal to continue it.[16] Studies have also shown Sirolismus to be beneficial in limiting progression of the disease.[17]In the case of this patient, the disease had reached such a stage where amputation was the only option to preserve the quality of life and address the chylothorax.

Conclusion

This report documents the case of a patient with GSD who presented at a very late stage. The patient had all the classic features of the disease, namely pathologic fracture, osteolysis, angiomatosis, pleural effusion, and chylothorax. The late presentation signifies the absence of GSD in the differentials of clinicians. Timely diagnosis may have helped to employ the other treatment options available.

This report aims to bring to light a very rare disease so that clinicians can suspect it after ruling out other differentials. Bisphosphonates and radiotherapy with 45Gy may prove beneficial in early stages of the disease, but destructive surgery such as amputation is the last resort in the advanced stage.

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MI, ZK: Data acquisition and analysis.
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HK: Drafting.
FJ, MT: Histopathology analysis.